



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

or is not, is necessary or contingent, true or false. But there is no room in nature for the Ought, as little as there is in logic, mathematics, or geometry. Let that suffice, and let future generations learn all the lessons contained in that simple word, I Ought, as interpreted by Kant. The materials are now accessible, and the English-speaking race, the race of the future, will have in Kant's 'Critique' another Aryan heirloom as precious as the 'Veda'—a work that may be criticised, but can never be ignored."

As the years roll by, and the ambitious intellect of man, forgetful of the lessons of the past, beats against its prison-bars and strives to break forth into the vast expanse of the unknowable to grapple with problems that it can never solve, if we will but look down the corridors of history, the figure of Kant will rise majestically before us, speaking, in that Categorical Imperative that he so fully interpreted to man, the solemn warning—"So far and no farther."

THE SO-CALLED PRIMARY QUALITIES OF MATTER: AN EXPOSITION AND CRITICISM.

BY J. M. RIGG.

There are certain philosophical questions to the clear comprehension of which it is almost essential that their historical antecedents should be accurately understood. Of these, the controversy concerning the nature of what, since Locke, have been commonly known as the primary qualities of matter is a conspicuous example. In a former paper read before this society¹ I drew attention to the partial correspondence of Aristotle's division of perceptions into common and particular with Locke's distinction between the primary and secondary qualities of matter, observing that, in so far as the correspondence fails, the advantage is on the side of Aristotle, the conversion of the common perceptions into qualities inhering in objects being a decidedly retrograde step. I purpose in the present paper, in the first place, to inquire whether any bet-

¹ The present paper was read before a London society, styling itself "The Philosophical Society," on June 25, 1885.—J. M. R.

ter division than Aristotle's has been suggested by any thinker subsequent to Locke, and then to discuss the relation of these common perceptions to the rest of cognition, and whether they involve any, and if so what, a *priori* element.

As enumerated by Aristotle, they are motion, rest, number, figure, and magnitude; and the primary qualities mentioned by Locke are these same five perceptions regarded as inherent in objects, with the addition of solidity. The addition, however, is a mistake, for solidity is not a primary quality in Locke's sense of the term at all—*i. e.*, it is not a quality "utterly inseparable from the body in what state soever it be"; it may disappear, *e. g.*, on the application of heat. If solidity is to be ranked as a primary quality, fluidity should be so likewise. In truth, what Locke meant by solidity seems to have been that greater or less degree of cohesiveness which all matter, fluid or solid alike, possesses; and this is really included in mobility.

The classification of Locke was adopted by Sir William Hamilton with a slight refinement—*i. e.*, he distinguished between primary, secundo-primary, and secondary qualities; and in this he is followed by Mr. Herbert Spencer,¹ who, however, introduces a new nomenclature, substituting *statical* for primary, *statico-dynamical* for secundo-primary, and *dynamical* for secondary. The reason assigned for thus altering the terminology may be briefly stated as follows: In the perception of the dynamical qualities the subject is passive and the object active, as in the radiation of heat, emission of odor, or propagation of sound; in the perception of the statico-dynamical qualities both subject and object are active, as in "grasping, thrusting, pulling, or any other mechanical process" (§ 317); in the perception of the statical qualities—*e. g.*, size, form, position—the subject is active and the object passive.

Now, there are two ways in which this classification is interpretable: (1) We may understand Mr. Spencer to mean what he says, viz., that, on the perception of the size, form, and position of an object, the object *is* passive, or (2) we may take him to mean merely that it is regarded as passive. The first mode of construction would make the size, form, and position of objects mere projections of the mind; but this Mr. Spencer cannot intend, since we know

¹ "Principles of Psychology," part vi, cap. xi.

from other parts of his writings that, in common with most psychologists, he regards perception as in all cases the result of a reaction of the mind upon stimulus; nay, he is wont to insist, with uncommon vigor, that space, of which size, form, and position are specific determinations, is no mere form of the *ego*, but has its objective counterpart. If, however, we construe his language as meaning that the statical qualities are not really statical, but only so regarded by common sense, the same course of construction must in consistency be applied to the statico-dynamical qualities also. So applied, however, it completely breaks down. The dynamical quality color is regarded by common sense as inhering in the object no less than size, figure, and position; so is the dynamical quality heat, and so are the statico-dynamical qualities hardness, softness, firmness, fluidity, roughness, smoothness, and the like. Mr. Spencer's mode of proving the statical nature of the space-attributes is a curious instance of inconsequence. He remarks (§ 326): "To an uncritical observer the visible form of an object seems as much thrust upon his consciousness by the object itself as its color is. But, on remembering that the visible form is revealed to him only through certain modifications of light, that these modifications are produced not by the form, but by certain occult properties of the substance having the form, and that, if the body had no power of reacting on light, the form would be invisible, it will be seen that the form is not known immediately, but mediately." From this it appears that the statical qualities are certain powers which body possesses of reacting on light, whereby the form of an object becomes mediately known. So far, then, from the adjective statical being appropriate to describe them, it would seem that they fall under the same category as the dynamical qualities, for these also, Mr. Spencer informs us (§ 318), "can be called attributes of body only in the sense that they imply in body certain powers of reaction which appropriate external actions call forth. These powers of reaction, however, are neither the attributes made known to us as sensations, nor those vibrations or undulations or molecular repulsions in which, as objectively considered, these attributes are commonly said to consist, but they are the occult properties in virtue of which body modifies the forces brought to bear upon it. Nevertheless, it remains true that these attributes as manifested to us are dynamical, and, in so far as the

immediate relation is concerned, it remains true that in respect of these attributes the object is active and the subject is passive." It appears, then, that while the statical qualities are certain occult properties or powers of reaction whereby body modifies light so as to produce visible form, bulk, and position, the dynamical qualities are certain occult properties or powers of reaction whereby body modifies the forces brought to bear upon it so as to produce light, color, heat, taste, and smell; in other words, in themselves either set of qualities is alike dynamical; it is only "as manifested to us," and "so far as the immediate relation is concerned," that in the one case the object alone, in the other case the subject alone, is active. This doctrine of "the immediate relation" is very dark and mysterious. If it be construed as importing that, in the perception of, *e. g.*, color, the subject is passive, that is inconsistent with Mr. Spencer's well-known, and I venture to say indisputable, thesis that perception always involves recognition and classification, both of which are just as necessary to the perception of a specific grade of light or shade of color as to the perception of the dimensions, or shape, or position of an object; the subject is active in the one case as in the other. If, however, it be suggested that Mr. Spencer, while speaking in terms of subject and object, is really thinking in terms of physical organism and environment, that, *e. g.*, when he says that the perception of the statico-dynamical and statical qualities involves the activity of the subject, he really means that such perception involves a movement of the organism or of some or one of its members, I answer that this interpretation gives no meaning to the distinction drawn between the passivity of the object in the perception of the statical qualities and its activity in the perception of the statico-dynamical qualities. The object is said by Mr. Spencer to be active when statico-dynamically perceived, because it resists pressure, passive when statically perceived, because no pressure is put on it, and therefore the capacity which it has "of meeting by a proportionate counteracting force any force brought to bear on it" (§ 322) is not elicited. Mr. Spencer can hardly mean that matter in resistance is a voluntary agent, meeting push with push and counteracting tug by tug, but, on any other construction of his language, it seems impossible to deny to matter perceived merely as in contact with the organism the same kind of activity which is ascribed to it when

resisting pressure. The only real distinction between the statico-dynamical and the statical qualities is that in the perception of the former the organism is more active than in the perception of the latter; but this is no reason for crediting the environment with the surplus activity of the organism.

In short, there is no mode of interpreting Mr. Spencer's doctrine which will render it logical, all perceptions being conceivable with equal propriety as the result of action and reaction between subject and object, and the distinction which he draws not being justified by the humble authority of common sense. The true distinction remains that which Aristotle drew between these perceptions which are particular, *i. e.*, to which one sense only is organic, and those which are common, *i. e.*, to which more than one sense is organic.

So much, then, being premised by way of mere logical and historical disquisition, I proceed to the detailed examination of these common perceptions, their nature and functions; and I will begin by remarking that not only are they common in the sense explained, but they also have a community *inter se*, in that they all fall under one and the same category—viz., extensive quantity. Number, and indeed time, which Aristotle included in number, do not in themselves, *i. e.*, as the elementary process of counting, and the bare distinction between past and present, contain any element of extensive quantity, but every one knows how much arithmetic and algebra are beholden to visible symbols, and the computation of time to motion. Number and time must therefore be ranked under the same category with the common perceptions. It therefore becomes important to determine whether the common element in these perceptions, extension, is itself an ultimate element, or whether it is analyzable into simpler terms.

Since Berkeley launched his "New Theory of Vision" on the world it has become a tradition with English empirical thinkers to attempt the derivation of extension from sensations of touch and muscular movement. The latest, and in many respects the most plausible, of these attempts, is that of Mr. Herbert Spencer, which I therefore proceed to examine.

Mr. Spencer's thesis is, that the ideas of space, time, and motion are all evolved, and evolved concurrently, out of sensations of muscular tension and touch (§ 344). The mode of evolution

supposed is as follows: He assumes a consciousness of a series of sensations of muscular tension of varying intensity, not, of course, recognized as due to the movement of a limb in the sense of the organ traversing space; this consciousness he is pleased to call one of subjective motion, though he admits, or rather asserts, that it has nothing in common with our consciousness of motion except the name. Such a consciousness, it must be observed, implies time, since no one can be conscious of a series of sensations except by distinguishing one or some of them as in present time from all the rest as occupying past time, and that in various degrees of priority. This ingenious theory, then, which is to explain the evolution of the idea of time, starts by presupposing it; that is Mr. Spencer's first, though by no means his last, assumption.

He then assumes that this series of muscular sensations gets associated with a series of tactual sensations (which again presupposes time), which in its turn becomes associated with a set of simultaneous tactual sensations (which once more presupposes time), which thereby come to be associated with the series of muscular sensations; and there, in the association of this set of simultaneous tactual sensations with the series of muscular sensations, he finds the "nascent" idea of space.

The plausibility (such as it is) of the view consists wholly in the likelihood of the student's confounding simultaneity with co-existence in space, and a tactual sensation with the perception of a portion of superficial extension. A tactual sensation, however, as Mr. Spencer himself elsewhere points out, does not necessarily involve any perception of resistance, while he also maintains that extension is only perceivable through the perception of resistance. Thus he says (§ 323): "When one of the fingers is brought gently in contact with anything, when a fly settles on the forehead, or when a hair gets into the mouth, there arises the sensation of *touch proper*. This sensation is undecomposable—is not accompanied by any sensation of pressure; and, though we always ascribe it to some resisting object, we cannot say that the resistance is given in the sensation." Then he lays down (§ 348) that extension is only known "through a combination of resistances." We may assume, then, that a set of simultaneous tactual sensations does not amount to a perception of extension. We must add (Mr.

Spencer tells us) the perception of "a combination of resistances" (§ 348). A combination of resistances, however, is a somewhat abstract mode of expression. Indeed, it may be remarked, in passing, that Mr. Spencer is very fond of abstract terms. He writes as if he had never heard of the controversy between realism and nominalism, out of which modern empirical philosophy sprung. If, however, following the wise precept of nominalism, we render "combination of resistances" into its concrete equivalent, we obtain a group of things occupying space, withstanding pressure, which certainly is not what Mr. Spencer means by a combination of resistances.

He, in fact, identifies resistance with the sensation of muscular tension. Thus he observes (§ 348): "As was shown in the last chapter, subjective motion is primarily known as a varying series of states of muscular tension—that is, sensations of resistance."

A combination of resistances, then, is, I presume, a set of simultaneous sensations of muscular tension. This definition, however, does not accord with the account given in the chapter on the statico-dynamical or resistance attributes. There he shows that to the perception of resistance there is necessary not only the sensation of muscular tension, but also that of pressure, which, "though often associated with that of muscular tension, often exists apart from it," as in the sensation experienced when a weight is laid on the open palm of the hand, and "in the ever-present experience of the reactive pressure of whatever surface supports the body" (§ 323).

Pressure alone, however, is not resistance; that implies the combination of pressure with a sensation of muscular tension. Thus, in analyzing hardness, he says (§ 324): "When we express our immediate experiences of a body by saying that it is hard, what are the experiences implied? First, a sensation of pressure of considerable intensity is implied; and if, as in most cases, this sensation is given to a finger voluntarily thrust against the object, then there is simultaneously felt a correspondingly strong sensation of muscular tension." Softness differs from hardness, implying further the sensation of muscular movement—*i. e.*, an alternate increase and decrease of muscular tension. "Considered by itself, then," he continues, "the perception of softness may be defined as the establishment in consciousness of a relation of simulta-

neity between three series of sensations—a series of increasing sensations of pressure, a series of increasing sensations of tension, and a series of sensations of motion. And the perception of hardness is the same, with the omission of the last series. As, however, hardness and softness are names for different degrees of the same attribute, these definitions must be understood in a relative sense.”

We may take it, then, from Mr. Spencer, that the perception of resistance involves at least two elements—(1) a series of increasing sensations of pressure, (2) a series of increasing sensations of tension. What, then, are we to think of his subsequent identification of the sensation of resistance with that of muscular tension, omitting altogether the sensation of pressure? The truth is that neither view is correct; neither muscular tension nor pressure, nor the two combined, amount to resistance; and this is actually recognized by Mr. Spencer at a later stage. Thus, toward the close of the chapter on the perception of resistance (§ 350), he says: “Originally the sensations of pressure which a developing creature passively receives, being unconnected in experience with definite antecedents and consequents, are as isolated and meaningless as sensations of sound or odor.” They only acquire a meaning, he assures us, by being interpreted as signs “of weight and of objective action,” and, before they can be so interpreted, “there must exist ideas of weight and objective action.”

Mr. Spencer’s theory, then, by his own admission, stands or falls with the analysis of weight and “objective action.” It is, therefore, incumbent on him to show that these ideas are derived from experiences of muscular tension. Has he done this? In order to answer this question it is necessary to examine his analysis of the idea of force, which is presumably what he means by “objective action.” This is contained in the chapter on resistance. There (§ 348), after referring to the analysis of motion contained in the preceding chapter, he proceeds: “Our notion of force also has a parallel genesis. Resistance, as known subjectively in our sensations of muscular tension, forms the substance of our consciousness of force. That we have such a consciousness is a fact which no metaphysical quibbling can set aside. That we must think of force in terms of our experience, must construct our conception of it out of the sensations we have received, is also be-

yond question. That we have never had and never can have any experience of the force by which objects produce changes in other objects is equally indisputable. And that, therefore, our notion of force is a generalization of these muscular sensations which we have when we are ourselves the producers of change in outward things is an inevitable corollary." On this I have to remark that, from the fact that we must think of force in terms of our experience, it does not follow that we "must construct our conception of it out of the sensations we have received." If that were so, we could never get the idea of force. No one in his senses, *e. g.*, regards the sensation of muscular tension which he has in pulling a boat up stream as the force which propels the boat; we regard both muscular tension and movement as results of the energy which we expend. Were it not that we consider ourselves as self-determining agents, not even Mr. Spencer could mistake the sensation of muscular tension for the source of our idea of force, or place it on any different footing from any other sensation which regularly antecedes another. Force primarily is the self-determining activity which we put forth in fixing the attention or forming an intention. It need not be accompanied by any sensation of muscular tension, though when intention becomes volition, and volition issues in outward act, it is so accompanied. The ascription of force to outward objects is a kind of quasi-personification of them. We term them active, speak of them as agents and reagents—expressions only rightly applicable to the self-conscious, self-determining subject.

There is, however, the less need to labor this point, as it is practically admitted by Mr. Spencer in the last paragraph of the chapter on the perception of resistance. There he says (§ 351): "Respecting the perception (that is, of muscular tension), it has still to be pointed out that it consists in the establishment of a relation between the muscular sensation itself and that state of consciousness which we call *will*-relation, such that the unbalanced surplus of feeling, of whatever kind, which for the moment constitutes the will, is the antecedent of the muscular sensation, and co-exists with it while it lasts. That the muscular sensation alone does not constitute a perception of resistance will be seen on remembering that we receive from a tired muscle a feeling nearly allied to, if not identical with, that which we receive from a muscle in action;

and that yet this feeling, being unconnected with any act of volition, does not give any notion of resistance." In speaking, then, of outward objects as resisting, as having weight, as exerting force, we are, according to Mr. Spencer, implicitly ascribing to them acts of volition accompanied by sensations of muscular tension. But how if we have no knowledge of outward objects? The intelligence whose development Mr. Spencer is endeavoring to trace is *ex hypothesi*, without knowledge of outwardness, of space in any of its dimensions; and his problem is to explain the origin of the idea of space as the result of sensations of muscular tension, or rather, as now explained, as the result of acts of volition accompanied by sensations of muscular tension. If we rigorously exclude the idea of space, whether as revealed by touch or by sight, and imagine a consciousness consisting wholly of acts of volition accompanied by sensations of muscular tension, it is impossible to understand how such an intelligence could ever transcend the idea of a similar intelligence exerting a like force, how it could ever come by the idea of an extended object. It might learn by experience that the sensations of pressure, so called, of which it was aware—sensations originally, as Mr. Spencer well says, "as isolated and meaningless," as far from conveying the idea of an extended object, "as sensations of sound or odor"—would, when not rising beyond a certain degree of intensity, disappear on the exertion of a certain quantity of will-force, and possibly might conclude that they were themselves the result of the exertion of similar force by a number of conscious beings, some of whom were stronger and others weaker than itself, and thus might develop a rude kind of polytheism; but there is no ground for supposing that it would ever arrive at the idea of extension in any dimension; and this is corroborated by the evidence of the boy couched by Cheselden and the blind man interrogated by Platner.

So far the argument has proceeded on the assumption that Mr. Spencer has proved that space is not directly perceivable by sight. On this point his utterances are very obscure. He says (§ 327): "Though it is manifest that superficial magnitude as known by sight is purely relative; that the same surface, according as it is placed close to the eye or a mile off, may occupy the whole field of view, or but an inappreciable portion of it, yet, as while an object is visible at all it must present *some* length and breadth, it

may be argued that superficial extension *in the abstract* is originally perceivable through the eyes as much as color is. This conclusion is in one sense true, and in another sense untrue."

The sense in which the conclusion is true is explained to be "that the visual organ, by its own size and construction, furnishes certain limits within which the space-interpretations must eventually fall." The sense in which it is untrue, apparently, is that it ignores a result which Mr. Spencer conceives to follow from the hypothesis of Young, that each fibre of the optic nerve is capable of independent stimulation—viz., that neither a serial nor a simultaneous excitation of such fibres can itself yield a perception of extension, but that the germ of the perception of extension is the establishment of an equivalence between "a quasi-single state of consciousness" arising from the simultaneous excitation of several fibres and a series of states of consciousness arising from the successive excitation of them consequent upon a movement of the retina, such movement being itself known only as a "subjective movement"—*i. e.*, as so much tension. How the association of a "quasi-single state of consciousness" with a series of states, so that the former comes to be the symbol of the latter and to be habitually thought of in place of that which it symbolizes, how, in other words, the translation of a series of states into a quasi-single state, which is not a consciousness of extension, the series being eventually merged in the quasi-single state, can be or become a consciousness of extension, Mr. Spencer does not explain. In lieu of explanation he coolly begs the question by simply calling the quasi-single state a relation between coexistent positions. Thus he says (§ 327): "We have seen that a set of retinal elements may be excited simultaneously; that so a quasi-single state of consciousness becomes the equivalent of a series of states; that a relation between what we call *coexistent positions* thus represents a relation of *successive positions*." That is to say, the quasi-single state of consciousness arising from the simultaneous excitation of the retinal elements is identified with the consciousness of coexistent positions, which a few pages before it was explicitly declared not to be. Then we read (p. 168): "If it be said that the extension is implied by the simultaneous excitation of B C D E F and all the fingers" (representing the retinal elements) "between A and Z, the difficulty is not escaped; for no idea of extension can arise

from the simultaneous excitation of these unless there is a knowledge of their relative positions, which is itself a knowledge of extension." Yet this very knowledge of extension he assumes, at the end of the same paragraph, to be given in the quasi-single state of consciousness. Still further to confound the confusion, we learn from § 334 that "on the one hand space cannot be thought of without coexistent positions being thought of," and "on the other hand coexistence cannot be thought of without at least two points in space being thought of," from the latter of which propositions it follows that no two events can be conceived as happening simultaneously—*i. e.*, as coexistent in time—unless they are envisaged as in space. Yet when we say that the attainment of virility coexists with a deepening of the voice, we do not figure to ourselves virility and the deep voice as occupying positions in space, and when we think of a given musical chord we do not need, in order to recognize the notes as coexistent, to clothe them with spatial relation. This confusion between coexistence in space and coexistence in time pervades Mr. Spencer's theory throughout, but the curious thing about it is, that it has a kind of double action; in other words, when he is trying to evolve the perception of space out of tactual and muscular sensations or out of the quasi-single state of consciousness resulting from the simultaneous excitation of the retinal elements, he resolves coexistence in space into simultaneity; when, as in § 334, he is preparing the way for the evolution of coexistence out of sequence which he afterward (cap. xxii) attempts, he identifies coexistence with coexistence in space, he has then only to evolve the perception of coexistence out of the perception of sequence in inverted order, and the Kantian doctrine is, he flatters himself, "finally disposed of."

I do not profess to be as familiar as Mr. Spencer with the contents of nascent intelligences; but, if such an intelligence is credited with the power of recognizing by a "duplex act of thought" a sequence as inverted (§§ 334, 366), I fail to understand why it may not be supposed capable of perceiving two series of events as occurring together; indeed, the latter operation seems to me to involve less activity than the former; and, if it be capable of perceiving two concurrent series of events, why not two adjacent portions of space? In any case, Mr. Spencer does not show how the perception in inverted order of a sequence, not being a se-

quence in space, can yield the perception of co-existence in space.

Moreover, not only is it not true that coexistence necessarily involves space, but it is not even true that space necessarily involves coexistence, except in the same sense as every relation involves coexistence. The terms of every relation must, of course, coexist in thought, and no otherwise do the terms of spatial relations coexist. If it is absurd to us that the assassination of Julius Cæsar coexists with the birth of Christ because both events are in time, it is equally absurd to us that London coexists with Calcutta because both cities are in space. Space, in fact, is the negation of coexistence. In time coexistence is really possible; a thousand events may, and indeed must, coexist in the same moment of time, but no two objects can possibly occupy the same space.

Mr. Spēncer's final definition of space as "the blank form of all relations of coexistence" seems to me a blank form indeed; and the same criticism is applicable to his parallel definition of time, "the blank form of all relations of sequence." No such blank forms do I find in my consciousness, and I think the power of abstraction does not extend so far as to enable us to frame them. Just as we cannot frame any idea of triangle in general or color in the abstract wholly dissociate from particular triangles and specific tints, so also I think we cannot conceive either time or space without a mental survey of particular times and places. Space and time do not seem to be definable in any better way than as the elementary distinctions between here and there and now and then, to which extension as the interval between a here and there and duration as the interval between a now and a then are related as specific determinations.

Figure, which Mr. Spencer vaguely says "is resolvable into relative magnitude of parts"—a definition which would not exclude any divided line—involves the comparison not only of magnitudes but of directions. Thus a line is simple spatial continuity, a straight line such continuity without change of direction, a curve such continuity with change of direction, a circle a curve returning upon itself in such way that the greatest interval is the same in all directions, a rectangle the equality of parallel straight lines, a square such equality when the line joining the terminations of the parallels is of the same length as they are, a

triangle the gradual diminution of parallel straight lines to a vanishing point; and but little ingenuity would be needed to show that all figures, however complex and irregular, are analyzable in the same way.

It seems, then, clear that space and time are immediate perceptions, or, if you like, intuitions, and as such insusceptible of analysis, and that it is only through them that sensations of muscular tension are interpretable in terms of motion; but this of course does not mean that either duration, or velocity, or distance, or magnitude is perceived immediately, *i. e.*, without comparison and computation, or even that no empirical factors enter into such computation.

Duration is the equation of that which in itself is a mere intuition of pastness, vaguely determinable as nearer or more remote by reference to the number of intervening memories, with a *quantum* of objective motion inferred from certain visible signs, and known to be equivalent, or approximately so, to some fraction or multiple of a day as vaguely measurable by memory.

Velocity is the quantum of extension traversable in a determinate period of duration; no element of, or derived from, muscular or tactual sensation necessarily enters into or even accompanies it. Thus if, descending the brow of a hill, I reckon that a certain church thence visible is so many miles distant, the miles of which I think are certainly not, unless I am very tired, conceived simply or mainly in terms of muscular tension, but as multiples of some portion of the extension which is visible to me on either hand, overhead, and on the level of my feet as I move.

Distance in a line with the axis of vision, which for the sake of distinction I term not extension but protension, is not perceivable immediately, for the simple reason that it presents no surface to the eye; but were it not that we have an immediate visual perception of extension—*i. e.*, of distance transverse to the axis of vision—we could not so much as infer protension. When we judge of the protensive distance of an object, we in fact calculate the rate of velocity necessary to place us within a certain period of duration in physical contact with it, and, in default of the perception of visible extension, we could estimate neither rate nor period.

Further, knowing that the apparent magnitude, vividness, and distinctness of objects vary inversely as their distance, we infer

that certain visible objects are larger than they appear; nevertheless, the standard of the real magnitude of which we speak is given not in tactual but in visual experience. It was through jumping to the conclusion that because the apparent magnitude of a foot-rule varies with its distance from the eye, therefore the feet and inches used in measurement are derived from tactual experience, that Berkeley¹ introduced into this subject a confusion which has gone on increasing since his day; yet it is obvious that, in the absence of sight, the standard of length would be less determinate than equity in the days of the early Chancellors; it would vary not with the size of the Chancellor's foot, but with the size of the foot of each individual man. The standard of length is simply a certain quantum of extension, which is nearly the same for everybody at that distance from the eye which is most convenient for the perception of objects which are held in the hand. Further, inasmuch as the accurate measurement of degrees of intensity involves the equation of them with specific *quanta* of motion, as vibrations and undulations of a determinate rapidity in the cases of light and sound, and molecular motions in the case of heat, and motion is neither perceivable, nor imagination, save through extension, it follows that an intelligence destitute of the idea of extensive quantity could have only the very vaguest notion of differences of degree. In a word, so far from resistance being the mother-tongue of thought, it would be nearer the mark to say that extension is so, since without it neither duration, nor velocity, nor distance, nor magnitude, nor intensive quantity, would be accurately measurable; and though number, being the reflection upon experience of the unity of consciousness by a series of acts of attention followed by a reflection in which the series is unified as a whole, exists for the congenitally blind, yet such persons labor under an immense difficulty in the scientific study of the subject; and, as it is impossible to understand how the "nascent" perception of extension could ever evolve out of the consciousness of mere simultaneity, while simultaneity and succession alike presuppose time, it would seem that the Kantian doctrine is not yet "finally disposed of."

It remains to observe that vacuum is the idea of space travers-

¹ "Theory of Vision," § 61.

able in all directions, and therefore presupposes motion ; and that the so-called infinity and infinite divisibility of space are the inability of the mind to perceive or imagine a space which is not bounded by circumjacent space and ideally divisible, just as we cannot conceive a number which is not susceptible both of increase and diminution.

GOESCHEL ON THE IMMORTALITY OF THE SOUL.

TRANSLATED FROM THE GERMAN OF CARL FRIEDRICH GOESCHEL BY SUSAN E. BLOW.

CHAPTER III—(*Concluded*).

The Triplicity of the Proofs of Immortality.

We have authenticated historically the relative order of the theological and psychological proofs, and justified this order in the development of thought. It remains necessary to consider the position of Consciousness, for it is in Consciousness that we find the above-mentioned order of proof. The spires of a cathedral shift with the varying standpoint of the beholder ; may not the position of the proofs vary with the standpoint of the thinker before whose mental gaze they are unfolded ?

The conscious starting-point of the process of proof is the difference between the visible and invisible, between being and essence, body and soul. Underlying this starting-point is the implicit presupposition of the difference between subject and object. Otherness is already recognized, and the proofs of personal immortality arise in the effort to protect the Individual as *Monad* from this otherness. Hence the standpoint of Reflection or difference is implied in the whole process of proof both in the theological and psychological spheres, as well as in the development of the concept of the soul itself from Individuality to Personality. With reflection, philosophy, in its dialectic form, begins, and through this dialectic comes to more profound analysis and more inclusive insights. From the standpoint of reflection the starting-point is the near and visible object, and from this transition is made to the object invisible and remote ; the mediation consists in the progress from the determined to the self-determining, from that which is willed to Absolute Will. The last and highest point reached is